

## Sequence Listing

<110> KANNO, Sohei  
KIMURA, Eiichiro  
MATSUI, Kazuhiko  
NAKAMATSU, Tsuyoshi

<120> ABC Transporter and Gene Coding for the Same

<130> B-528SM0P924

<141> 1999-12-16

<150> JP 10-360621

<151> 1998-12-18

<160> 10

<170> PatentIn Ver. 2.0

<210> 1

<211> 17

<212> DNA

<213> Artificial Sequence

<220>

<221> UNSURE

<222> (3,9,12)

<223>-n=a-or-c-or-g-or-t

<220>

<223> Description of Artificial Sequence:primer for  
amplifying Brevibacterium lactofermentum gltBD gene

<400> 1

ggngarggng gngarga

<210> 2  
 <211> 18  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <221> UNSURE  
 <222> (1,4,7,)  
 <223> n=a or c or g or t

<220>  
 <223> Description of Artificial Sequence:primer for  
 amplifying *Brevibacterium lactofermentum* gltBD gene

<400> 2  
 nccnccngtc atrtaytc

18

<210> 3  
 <211> 32  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence:primer for  
 amplifying *Brevibacterium lactofermentum* gltBD gene

<400> 3  
 aatccacgtg aagcttagtgg cagaacaagg cg

32

<210> 4  
 <211> 30  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence:primer for  
 amplifying *Brevibacterium lactofermentum* gltBD gene

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 acgaatgaac aattcaccac tggttgcgcc

30

<210> 5  
 <211> 22  
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 <213> Artificial Sequence

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 <223> Description of Artificial Sequence:primer for  
 amplifying downstream region of gltBD gene

<400> 5  
 atcctcgaca aggatctgtc cg

22

<210> 6  
 <211> 30  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence:primer for  
 amplifying downstream region of gltBD gene

<400> 6  
 ggtttgtcaa gtgtgccaa agacgttgagc

30

<210> 7  
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 <212> DNA  
 <213> Brevibacterium lactofermentum

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 <221> CDS  
 <222> (1)..(1101)

<220>  
 <221> CDS  
 <222> (1117)..(1725)

<220>  
 <221> CDS  
 <222> (1759)..(2367)

003654-00000000000000000000000000000000

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atg ctg gcg acc cga cta att acc ttg ttc ttt ttc cta gga atc att	48
Met Leu Ala Thr Arg Leu Ile Thr Leu Phe Phe Phe Leu Gly Ile Ile	
1 5 10 15	
gga tcg cta acc ggt aac ctc agt gaa cta cgt gca caa act act ttt	96
Gly Ser Leu Thr Gly Asn Leu Ser Glu Leu Arg Ala Gln Thr Thr Phe	
20 25 30	
agt aca tta tgg gat acc cat aaa gaa acc tat aga gtc tcc ata gct	144
Ser Thr Leu Trp Asp Thr His Lys Glu Thr Tyr Arg Val Ser Ile Ala	
35 40 45	
tcc gca gca gga caa gac ttc tac ggg ctt gct gag act cta cgc act	192
Ser Ala Ala Gly Gln Asp Phe Tyr Gly Leu Ala Glu Thr Leu Arg Thr	
50 55 60	
atg gat agg cat ggg gaa att att ttg gca gat cgt caa tgg tta aca	240
Met Asp Arg His Gly Glu Ile Ile Leu Ala Asp Arg Gln Trp Leu Thr	
65 70 75 80	
gct ccc ctt gat atc ggt gca cca gtc gta tta tca aac aca act ttt	288
Ala Pro Leu Asp Ile Gly Ala Pro Val Val Leu Ser Asn Thr Thr Phe	
85 90 95	
gcc gtt gat gaa gga cta ctt gcg cca aaa gat cta ccg caa agt gac	336
Ala Val Asp Glu Gly Leu Leu Ala Pro Lys Asp Leu Pro Gln Ser Asp	
100 105 110	
gag atc aca ata ttg cat cct cag ttt ctg gat tcg gcc aaa gag cca	384
Glu Ile Thr Ile Leu His Pro Gln Phe Leu Asp Ser Ala Lys Glu Pro	
115 120 125	
gaa tta ctt ggt ttg ctg gag ttc gaa gca tcc aac tca caa gtg cca	432
Glu Leu Leu Gly Leu Leu Glu Phe Glu Ala Ser Asn Ser Gln Val Pro	
130 135 140	
atg cca aag atc caa agc att cca tat gat agc gaa gac tca acc aac	480
Met Pro Lys Ile Gln Ser Ile Pro Tyr Asp Ser Glu Asp Ser Thr Asn	
145 150 155 160	
ccc atg tct gaa gtt ttt acc tac aac att aac ctg gat agt gca gta	528
Pro Met Ser Glu Val Phe Thr Tyr Asn Ile Asn Leu Asp Ser Ala Val	
165 170 175	
aga aac cca atc gta gtt atc ctt ccc gca ggc tta gag ctt tta agt	576
Arg Asn Pro Ile Val Val Ile Leu Pro Ala Gly Leu Glu Leu Leu Ser	
180 185 190	
gat caa aat ttg tcg gct cga ctc aca cag aat agt ctg ctg ata aaa	624
Asp Gln Asn Leu Ser Ala Arg Leu Thr Gln Asn Ser Leu Leu Ile Lys	
195 200 205	
gac cag act ggt gtg aac gct ctt cta tcc tca gag gat tca cgc aat	672

Asp Gln Thr Gly Val Asn Ala Leu Leu Ser Ser Glu Asp Ser Arg Asn			
210	215	220	
tat gtg gga gct gca tcc ccg atg att gac acg tgg gaa gaa agc gtt			720
Tyr Val Gly Ala Ala Ser Pro Met Ile Asp Thr Trp Glu Glu Ser Val			
225	230	235	240
gtt ccg ttg aag gaa gcg aac caa ata atc gcc ttc aac gct ttc att			768
Val Arg Leu Lys Glu Ala Asn Gln Ile Ile Ala Phe Asn Ala Phe Ile			
245	250	255	
gca ttg ttc ctc acg acg act ctt gtt cta gca tac tgc act ggt att			816
Ala Leu Phe Leu Thr Thr Leu Val Leu Ala Tyr Cys Thr Gly Ile			
260	265	270	
tca ttt aag aaa tca aag aag act atg ggt agc gca tct act agg aaa			864
Ser Phe Lys Lys Ser Lys Lys Thr Met Gly Ser Ala Ser Thr Arg Lys			
275	280	285	
tca tcc att aag agc tcg att aca gct gct aat tgt aga agt aat ttt			912
Ser Ser Ile Lys Ser Ser Ile Thr Ala Ala Asn Cys Arg Ser Asn Phe			
290	295	300	
cgc ttc aat tcc gtg cgt ctg gct cgc gaa ccg cta ttt cga gcg atc			960
Arg Phe Asn Ser Val Arg Leu Ala Arg Glu Pro Leu Phe Arg Ala Ile			
305	310	315	320
tgc agc aat agc ttc aga tgc tcc ctc agc cag ata ctt aga aca tct			1008
Cys Ser Asn Ser Phe Arg Cys Ser Leu Ser Gln Ile Leu Arg Thr Ser			
325	330	335	
caa ttc tat acc tcc atc act gcc gtt ggt ttt agg aat ctt aat aat			1056
Gln Phe Tyr Thr Ser Ile Thr Ala Val Gly Phe Arg Asn Leu Asn Asn			
340	345	350	
cgg ttg gac ttc act ttc att ttt cag ttc gat gaa gct tcc ttt			1101
Arg Leu Asp Phe Thr Phe Ile Phe Gln Phe Asp Glu Ala Ser Phe			
355	360	365	
tgaaaaagagc acaca atg ata gaa atc aat gac ctc aag aaa tct ttt ggc			1152
Met Ile Glu Ile Asn Asp Leu Lys Ser Phe Gly			
1	5	10	
gtt cgg atc tta tgg caa ggt ctc agt cat aag ttt tta cca gga aca			1200
Val Arg Ile Leu Trp Gln Gly Leu Ser His Lys Phe Leu Pro Gly Thr			
15	20	25	
atg aca gca ctg act gga gcg tcc ggt tca gga aaa tcg act ttg ctc			1248
Met Thr Ala Leu Thr Gly Ala Ser Gly Ser Gly Lys Ser Thr Leu Leu			
30	35	40	
aac tgt ctt ggc aca ctt gac aaa cca agt tcc gga cag atc ctt gtc			1296
Asn Cys Leu Gly Thr Leu Asp Lys Pro Ser Ser Gly Gln Ile Leu Val			
45	50	55	60

gag gat gta gac ctt ctg aaa ctc tct acg cgt aag caa cgg tta tac			1344
Glu Asp Val Asp Leu Leu Lys Leu Ser Thr Arg Lys Gln Arg Leu Tyr			
65	70	75	
agg aaa aat acg gtg ggc tat tta ttt caa gat tat gcc ttg att ccc			1392
Arg Lys Asn Thr Val Gly Tyr Leu Phe Gln Asp Tyr Ala Leu Ile Pro			
80	85	90	
gac agg aca gtt aaa ttc aac ctt cag ctt gcg gtg gaa aaa cac aaa			1440
Asp Arg Thr Val Lys Phe Asn Leu Gln Leu Ala Val Glu Lys His Lys			
95	100	105	
tgg cct gaa att cct caa gta ctt cat gct gtt ggt ctt gag tcg ttc			1488
Trp Pro Glu Ile Pro Gln Val Leu His Ala Val Gly Leu Glu Ser Phe			
110	115	120	
gag gaa aag cca gtt ttt gaa ctc tct ggt ggc gaa caa caa cga act			1536
Glu Glu Lys Pro Val Phe Glu Leu Ser Gly Gly Glu Gln Gln Arg Thr			
125	130	135	140
gcg ttg gcc cgg gta ctg ctc aaa aat ccc cga ata att ctg gct gat			1584
Ala Leu Ala Arg Val Leu Leu Lys Asn Pro Arg Ile Ile Leu Ala Asp			
145	150	155	
gaa cca acc gga gct cta gat tta aca aac agt gag cta gtc ata gaa			1632
Glu Pro Thr Gly Ala Leu Asp Leu Thr Asn Ser Glu Leu Val Ile Glu			
160	165	170	
gca ttg aga gca ctc gcc gac aaa ggc gcc acc gtt gtt gtt gct acg			1680
Ala Leu Arg Ala Leu Ala Asp Lys Gly Ala Thr Val Val Val Ala Thr			
175	180	185	
cac tcg ccc ctc ttc cga gaa tca gcg gat acc att atc aaa cta			1725
His Ser Pro Leu Phe Arg Glu Ser Ala Asp Thr Ile Ile Lys Leu			
190	195	200	
taggtgccccc aactttcgg agatctcagt gca atg atg gaa ttc tta aac act			1779
Met Met Glu Phe Leu Asn Thr			
1	5		
cac cgt ttg att gtt ctc ggg agt ttg tct ttt cta ggg cta ggt ttc			1827
His Arg Leu Ile Val Leu Gly Ser Leu Ser Phe Leu Gly Leu Gly Phe			
10	15	20	
gcg gaa gtc ctg ctg cgt ggc cag tgg tca aca ccg cag ttt ttt gtt			1875
Ala Glu Val Leu Leu Arg Gly Gln Trp Ser Thr Pro Gln Phe Phe Val			
25	30	35	
ttc act ttc ttg caa act ctg ctt ctc gta ttg tgt ttt att cct aaa			1923
Phe Thr Phe Leu Gln Thr Leu Leu Val Leu Cys Phe Ile Pro Lys			
40	45	50	55
ctc tcg gtt cct ttt gtg gtg ctt cta agc att gcc caa ctc gcg ctt			1971
Leu Ser Val Pro Phe Val Val Leu Leu Ser Ile Ala Gln Leu Ala Leu			

60	65	70	
gca tac ctg tgt att cat ggt gaa cct caa agc acc agc cct ttc act			2019
Ala Tyr Leu Cys Ile His Gly Glu Pro Gln Ser Thr Ser Pro Phe Thr			
75	80	85	
tta att gtt gcc caa atg gcg ttt tcg gga ttg ctc atg ttc aga ggg			2067
Leu Ile Val Ala Gln Met Ala Phe Ser Gly Leu Leu Met Phe Arg Gly			
90	95	100	
caa cgg gtg ctc gct ttt atc tct gca ggt ggg ctc att tgg att ggg			2115
Gln Arg Val Leu Ala Phe Ile Ser Ala Gly Gly Leu Ile Trp Ile Gly			
105	110	115	
acc atc gat cca aca aac ggt gct tgg tct cct cat gtg atg tcc gcg			2163
Thr Ile Asp Pro Thr Asn Gly Ala Trp Ser Pro His Val Met Ser Ala			
120	125	130	135
cta gca ctt gcc gta ttc ttt gcg ctg tcg atg gca ctt gga cag gtt			2211
Leu Ala Leu Ala Val Phe Phe Ala Leu Ser Met Ala Leu Gly Gln Val			
140	145	150	
ctt cga tca aaa gtt gaa caa aga gcc aac ctt gag gag cag gca aaa			2259
Leu Arg Ser Lys Val Glu Gln Arg Ala Asn Leu Glu Glu Gln Ala Lys			
155	160	165	
att cag aca gaa ctg cgc aga aaa gaa cta agc act cca tct gca tcg			2307
Ile Gln Thr Glu Leu Arg Arg Lys Glu Leu Ser Thr Pro Ser Ala Ser			
170	175	180	
gtc ggt tgc caa aga act tac gtt tgc agt gat gaa atc gca gga gct			2355
Val Gly Cys Gln Arg Thr Tyr Val Cys Ser Asp Glu Ile Ala Gly Ala			
185	190	195	
cag tgg tcg cga taa			2370
Gln Trp Ser Arg			
200			

<210> 8

<211> 367

<212> PRT

<213> *Brevibacterium lactofermentum*

<400> 8

Met Leu Ala Thr Arg Leu Ile Thr Leu Phe Phe Phe Leu Gly Ile Ile

1 5 10 15

Gly Ser Leu Thr Gly Asn Leu Ser Glu Leu Arg Ala Gln Thr Thr Phe

20 25 30

Ser Thr Leu Trp Asp Thr His Lys Glu Thr Tyr Arg Val Ser Ile Ala

35 40 45

Ser Ala Ala Gly Gln Asp Phe Tyr Gly Leu Ala Glu Thr Leu Arg Thr  
 50 55 60  
 Met Asp Arg His Gly Glu Ile Ile Leu Ala Asp Arg Gln Trp Leu Thr  
 65 70 75 80  
 Ala Pro Leu Asp Ile Gly Ala Pro Val Val Leu Ser Asn Thr Thr Phe  
 85 90 95  
 Ala Val Asp Glu Gly Leu Leu Ala Pro Lys Asp Leu Pro Gln Ser Asp  
 100 105 110  
 Glu Ile Thr Ile Leu His Pro Gln Phe Leu Asp Ser Ala Lys Glu Pro  
 115 120 125  
 Glu Leu Leu Gly Leu Leu Glu Phe Glu Ala Ser Asn Ser Gln Val Pro  
 130 135 140  
 Met Pro Lys Ile Gln Ser Ile Pro Tyr Asp Ser Glu Asp Ser Thr Asn  
 145 150 155 160  
 Pro Met Ser Glu Val Phe Thr Tyr Asn Ile Asn Leu Asp Ser Ala Val  
 165 170 175  
 Arg Asn Pro Ile Val Val Ile Leu Pro Ala Gly Leu Glu Leu Leu Ser  
 180 185 190  
 Asp Gln Asn Leu Ser Ala Arg Leu Thr Gln Asn Ser Leu Leu Ile Lys  
 195 200 205  
 Asp Gln Thr Gly Val Asn Ala Leu Leu Ser Ser Glu Asp Ser Arg Asn  
 210 215 220  
 Tyr Val Gly Ala Ala Ser Pro Met Ile Asp Thr Trp Glu Glu Ser Val  
 225 230 235 240  
 Val Arg Leu Lys Glu Ala Asn Gln Ile Ile Ala Phe Asn Ala Phe Ile  
 245 250 255  
 Ala Leu Phe Leu Thr Thr Leu Val Leu Ala Tyr Cys Thr Gly Ile  
 260 265 270  
 Ser Phe Lys Lys Ser Lys Lys Thr Met Gly Ser Ala Ser Thr Arg Lys  
 275 280 285  
 Ser Ser Ile Lys Ser Ser Ile Thr Ala Ala Asn Cys Arg Ser Asn Phe  
 290 295 300  
 Arg Phe Asn Ser Val Arg Leu Ala Arg Glu Pro Leu Phe Arg Ala Ile  
 305 310 315 320  
 Cys Ser Asn Ser Phe Arg Cys Ser Leu Ser Gln Ile Leu Arg Thr Ser  
 325 330 335  
 Gln Phe Tyr Thr Ser Ile Thr Ala Val Gly Phe Arg Asn Leu Asn Asn  
 340 345 350  
 Arg Leu Asp Phe Thr Phe Ile Phe Gln Phe Asp Glu Ala Ser Phe  
 355 360 365

DRAFT

<210> 9  
<211> 203  
<212> PRT  
<213> *Brevibacterium lactofermentum*

<400> 9

<210> 10  
<211> 203  
<212> PRT  
<213> *Brevibacterium lactofermentum*

<400> 10

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1 5 10 15

Ser Phe Leu Gly Leu Gly Phe Ala Glu Val Leu Leu Arg Gly Gln Trp  
                  20                 25                 30  
 Ser Thr Pro Gln Phe Phe Val Phe Thr Phe Leu Gln Thr Leu Leu Leu  
                  35                 40                 45  
 Val Leu Cys Phe Ile Pro Lys Leu Ser Val Pro Phe Val Val Leu Leu  
                  50                 55                 60  
 Ser Ile Ala Gln Leu Ala Leu Ala Tyr Leu Cys Ile His Gly Glu Pro  
                  65                 70                 75                 80  
 Gln Ser Thr Ser Pro Phe Thr Leu Ile Val Ala Gln Met Ala Phe Ser  
                  85                 90                 95  
 Gly Leu Leu Met Phe Arg Gly Gln Arg Val Leu Ala Phe Ile Ser Ala  
                  100                 105                 110  
 Gly Gly Leu Ile Trp Ile Gly Thr Ile Asp Pro Thr Asn Gly Ala Trp  
                  115                 120                 125  
 Ser Pro His Val Met Ser Ala Leu Ala Leu Ala Val Phe Phe Ala Leu  
                  130                 135                 140  
 Ser Met Ala Leu Gly Gln Val Leu Arg Ser Lys Val Glu Gln Arg Ala  
                  145                 150                 155                 160  
 Asn Leu Glu Glu Gln Ala Lys Ile Gln Thr Glu Leu Arg Arg Lys Glu  
                  165                 170                 175  
 Leu Ser Thr Pro Ser Ala Ser Val Gly Cys Gln Arg Thr Tyr Val Cys  
                  180                 185                 190  
 Ser Asp Glu Ile Ala Gly Ala Gln Trp Ser Arg  
                  195                 200